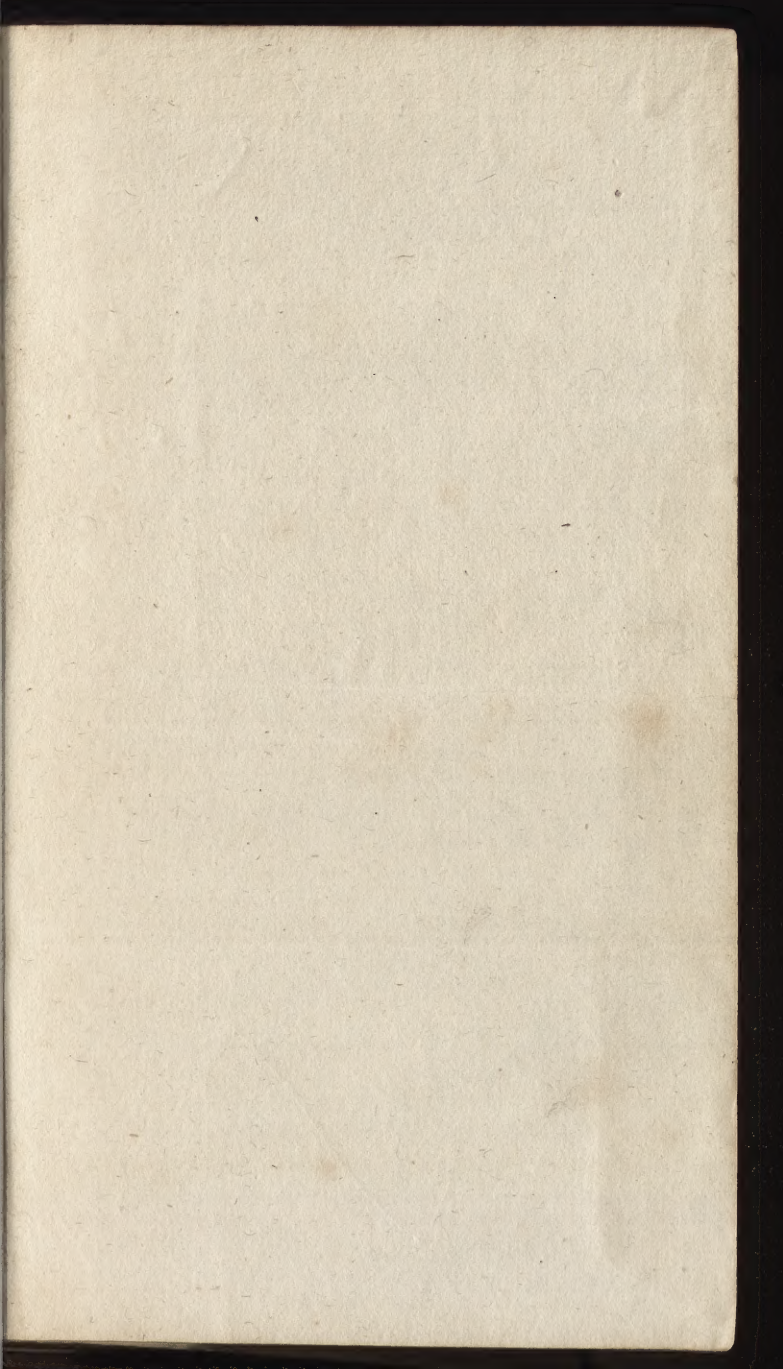
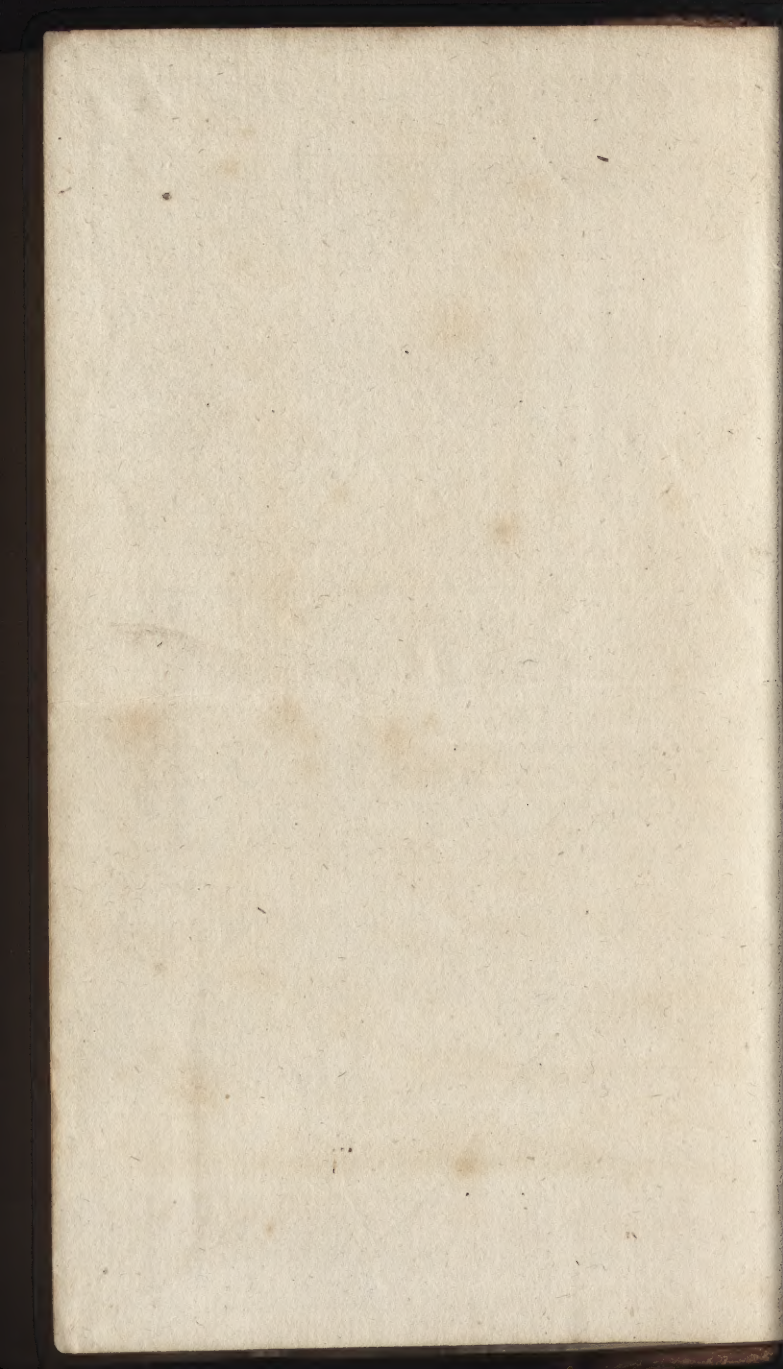
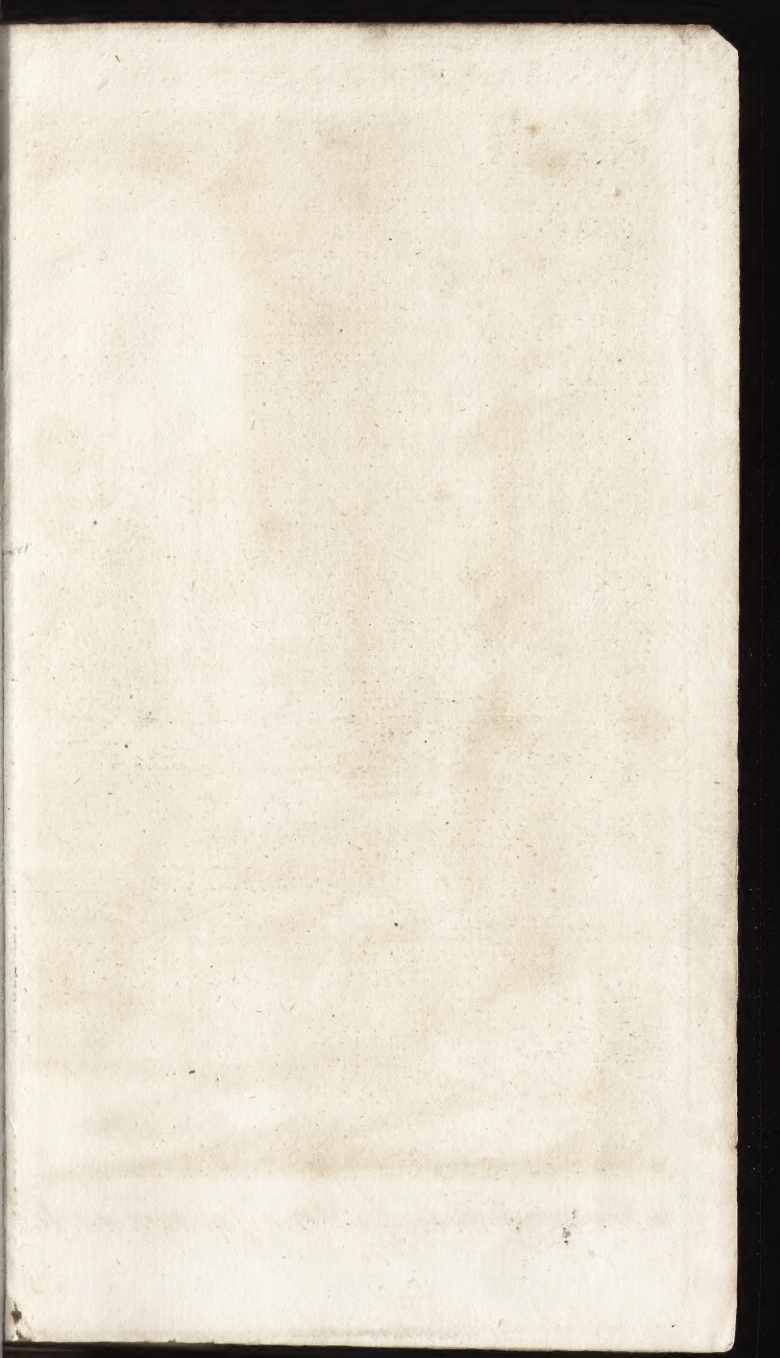


M. B. A.









FRONTISPIECE.



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*Minerva teaching the Art of painting in Oil.*

THE  
ART  
OF  
PAINTING IN OIL.

WHEREIN IS INCLUDED

Each particular Circumstance relating to that Art and Mystery; with the best and most approved Rules for the Preparing, Mixing, and Working of Oil- Colours.

The whole Treatise being so complete, and so exactly fitted to the meanest Capacity, that all Persons may be able, by these Directions, to paint in Oil Colours, all Manner of Timber-Work; such as Posts, Pales, Palisadoes, Gates, Doors, or any Thing else that requires either Use, Beauty, or Preservation from the Violence or Injury of the Weather.

In which are also particularly laid down all the several Circumstances required in Painting of Sun-Dials, Printed Pictures, Sash-Windows, &c. in Oil Colours.

THE NINTH EDITION, REVISED AND CORRECTED.

To which is added, The whole Art and Mystery of Colouring Maps, and other Prints, with Water Colours.

By JOHN SMITH, C.M.

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L O N D O N :

Printed for J. BEW, No. 28, in Pater-noster Row.

MDCCLXXXVIII.

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## P R E F A C E.

**T**HE former Impressions of this Work having given Satisfaction to many ingenious Persons that were desirous of some Instructions in the Art of Painting in Oil Colours, I have been desired to take some Pains to revise and correct this new Edition, which I hope I have done to the Satisfaction of all; there not being wanting in it, any one Circumstance that is requisite in a Work of this Nature.

No Man will imagine that this Book is designed to instruct professed Painters, whose Knowledge of the Subject must be supposed to outstrip these first Rudiments of their own Profession. Its

## P R E F A C E.

chief Design is, to instruct such ingenious Persons as are desirous of some Insight into the Nature of Working in Oil Colours.

Besides this, such Gentlemen as live far remote from Cities and Towns where Painters usually reside, may sometimes find it prudent, to attempt themselves in preserving such Ornaments of their Habitations as are most exposed to the Violence of Rain and Wet; there being less Trouble and Expence in preserving that already made, than in making new. When a Gentleman, therefore, has been at the Charge of fitting his Habitation with good Doors and Gates, has fenced it about with Pales, and adorned his Gardens with Borders, Palisadoes, Seats, and Arbours, it is easy for any of his Servants, by the Directions here given,  
to

## P R E F A C E.

to paint any of these, or any other Kinds of Timber-work in Oil Colours.

In Painting of Sun-Dials, I have been very particular; because many Books being extant, that teach the Way of drawing Dials, and many Gentlemen being very expert in them, but yet few or none being able to paint their Dial on the Plane, when they have drawn the Draught, I thought it not Time ill spent, to set down the several material Particulars relating to that Work; not doubting but all Persons, that are Lovers of Art, will add this Book to that Part of their Library that relates to Dialling.

In the whole Work I have been careful to relate only Matter of Fact, and to set down only such Rules and Observations, as by infallible Experiments I  
my-

## P R E F A C E.

myself have found true ; avoiding altogether, Things speculative, or what is only known by Hearsay ; and, therefore, as to all the Particulars contained in it, the Reader may rely upon them as true and certain.

CON-

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THE  
ART  
OF

PAINTING.

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CHAP. I.

*An Account of the several Tools, or manual Utensils, that are used in the Art of Vulgar Painting.*

THE first is the grind-stone and muller for grinding colours. The stone must be a hard, spotted, or rance marble, of a close grain, not spongy, or full of small pores; for if the grain of the stone be not close, but hollow and spongy, the colours that are first ground on it cannot so well be cleansed off, but that some part will

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still

still remain in these hollow pores of the stone, which will much spoil the beauty and lustre of those other colours that are ground after it. This stone for grinding ought to be about a foot and a half square, and so thick that it's weight may be sufficient to keep it fast and steady, and not apt to be moved when colours are grinding on it.

2. The muller is a pebble-stone, of the form of an egg, the larger end of which is to be broken off, and with sharp sand or emery it must be ground smooth and flat, on some other hard flat stone; and the edges of it must be well rounded off, that the colours may the better slide under it when it is moved round. This stone ought to be about two inches diameter, or three at most, on the flat end, and about five inches high, that so you may command it the more easily in the time of grinding.

For want of a spotted marble (which is a stone of a hazel colour, compact, of a number of kernels, as it were, in the grit of it) you may make use of any kind of hard marble, either white or black; some I have  
known

known to use a slate, such as, in Suffex, they cover their houses with, being in large pieces; some of which I have seen above two foot square, and an inch and a half thick; which kind of slates for vulgar paintings may serve very well.

When a good-shaped stone for a muller is wanting, a fragment of any smooth-sided stone, cemented (with rosin and brick-dust mixed together) into a piece of wood of a fit shape to hold it by, has performed the work as well as the best muller in the shops.

3. To these belong a voider, being no other than a lantern horn, about three inches one way, and four the other; this voider is to clear off the colours from the stone when ground, and also to keep them together in the time of grinding, when it spreads too much.

For want of this, a smooth piece of wood of the same size, cut thin and made very sharp and even on the edge, may serve as well.

4. Pots and pans must also be provided, either of earth or tin, of several sizes, ac-

ording to the quantity of colours to be ground, into which they are still to be put as you grind, till you have ground colour enough, of each sort, as may be necessary about the work you design them for.

But, in case you intend to grind at one time so much of each colour as may be sufficient to serve your occasions a long time together, as some do; then, when you have ground such quantities of each as you think fit, let them be put up and tied close in ox-bladders, or in the bladders of hogs or sheep. This will preserve them a long time from drying or spoiling.—Colours have been known to be preserved in this manner seventeen years.

5. You must be also provided with brushes and pencils of all sorts and sizes. Brushes are always made of hogs bristles. They are of several sizes and shapes, some round, and others flat. The round ones are of all sizes, from two inches diameter to a quarter of an inch; those of the largest size are for priming the work, and for laying such colours as are used in great quantities, and in colouring

louring over the superficies of all large work; such as posts, pales, wainscot, &c. The smaller sort of brushes are to use in such parts and places of any work in which larger ones cannot well come to work.

Flat brushes are chiefly in use for drawing of lines, and in the imitation of olive and walnut-work.

6. As for pencils, they are compounded of a finer and smaller hair. These also are of several sizes, but all generally round, being for the most part fitted into swans, geese, or ducks quills, and from thence are termed swans-quills, fitched or pointed; goose-quills, fitched and pointed; ducks-quills, fitched and pointed. Besides these, there is a larger sort of pencils in tin cases, and some in stocks, like brushes, all made of the fine hair.

In the choice of brushes and pencils, observe these rules: for brushes, observe whether the bristles are fast bound in the stocks, and the hair strong, and lie close together; for if they do not lie close, but spread abroad, such will never work well; if they

are not fast bound in the stock, the bristles will come out when you are using them, and spoil your work ; for such I have seen, where the loose hairs, from the brush, have lain buried up and down in the colours laid on, to the great disparagement of the work. To prevent this, if they are not fast bound, drive in some thin wooden wedges between the thread, with which they are bound round ; and by thus doing, the bristles will be made tight and secure.

In choosing pencils, especially the pointed ones, do thus ; put them into your mouth, and moisten them a little, then draw them forth between the tongue and the lip, and if they come out with an entire sharp point, without cleaving in twain, they are good ; provided, also, they be thick and full set next the quill, and fast bound ; if they be thin and lean next the quill, they never stand well to the work, nor draw sharp and clever.

To every one of these case or quill-pencils, let a neat stock be fitted, about nine inches in length, at the least ; for, unless  
the

the pencil be held a good distance from the hand, you shall never be able to command it well, nor work so neat, as when you have the true command of a pencil, held thus at a large distance, your hand being supported, as is usual, by a ruler, or small walking-stick; one end of which you must hold in your left hand, and the other must rest on the work, but yet so as not to do it any injury.

7. If you have, at any time, occasion to gild with leaf-gold, on an oily size, according to the usual practice of painters, there do then belong to this work several distinct manual tools: as, first, a cushion, upon which the leaves of gold must be laid, when they are to be cut into such forms as fit the work you are to gild. This gilding-cushion is generally made of a smooth-grained basil-skin, the flesh side outward; this is to be nailed to the edges of a square wooden bottom, about six inches square, and then well stuffed out with cotton or wool, very hard, plain, and flattish. Upon this gilding-cushion the gold leaves are to be laid, when  
you

you would cut them into such scantlings as will best fit the work you design to gild.

8. The instrument you make use of to cut the leaves, must be either a sharp smooth-edged case knife, or else a slip of the hollow Spanish cane, cut up to a smooth and sharp edge with a good penknife; this cane knife is counted the best, because, if well made, it will not only be very sharp, but also cut the gold leaf more naturally than any other; for a steel knife, though it cut very well, yet the gold will stick to it, and so give you much trouble to part the leaf from it, except you are careful to keep the edge very dry, by continually wiping of it with a clean and dry cloth; whereas a cane knife will put you to no such trouble in the use of it; its substance being of such a nature, as not to retain any viscous or clammy matter, capable of making the gold stick to it.

9. When by the use of these you have cut out the leaves of gold into proper scantlings, it must then be taken from off the cushion, and laid down upon the work you are to gild; to perform which, if the work  
be

be flat and plain, you must use the gilding-pallet; it is only a flat piece of wood about three inches long, and an inch broad, upon which is to be glued a piece of fine woollen cloth of the same length and breadth: upon this pallet do but breathe with your breath, that the cloth may be made a little moist by it, then if you clap it down gently on the gold that is cut out, it will stick to the pallet, and may from thence be readily conveyed to the work you are to gild, and laid down on it; but this kind of tool is only for flat and plain work, in which case, if you are to cover any large quantity of work, your pallet may be as large as the whole leaf of gold, and so you may transfer them from the book to the work, without farther trouble of cutting into smaller parts.

10. But if it be any hollow or carved work that is to be gilt, then painters do usually take up their gold, either from the book or cushion, with a bunch of cotton-yarn, a little moistened with their breath; for cotton is a material very apt and fit to press into the hollowness of the work, with  
the

the gold upon it; in case you want cotton, a bunch of good fine wool may do as well.

But if this gold be to be laid on within the hollows of carved work, then you must use a fine camels-hair pencil, of such a size as is fuitable; this, when moistened by breathing on it, will take up your leaf-gold, and by the help thereof the gold may be laid in any hollow work.

Black-lead pencils are of so great use in drawing, in some cases, that a painter can very ill want them; as also good chalk. The chalk must be such as is of a soft grain, that will easily spend itself on the work you draw upon; if the chalk be of a hard stony nature, it will spoil whatever you draw upon, for you must press so hard to make it spend itself, that the work will be full of deep races, not to be afterward obliterated; a great damage to the beauty of the work.

II. For black-lead pencils, those that are right good are not easy to be gotten; therefore, that you may not be deceived in the choice of them, take notice, that the best black lead pencil is that which spends its colour

colour freely, and draws black with an easy and light stroke: the goodness of the lead may also be known by the grain of it; the best lead, if you shave off a little of it with a sharp knife, will appear smooth and shining as glass, not hollow or spongy; that lead which, when cut, appears not with a good gloss, is of a dull colour, and of a hollow spongy grain, is of little or no value, for the grain is so hard, it will never spend black, nor draw freely.

Besides this, the common pencils of the shops are made up so deceitfully, that they are not good lead half way up the stock; the best way therefore, is, to buy black lead in the lump at the colour shops, and with a fine spring saw, cut it into scantlings of the bigness of a quill, into which you may fit it; and having fastened it in with glue, it will be found much better and cheaper, than to buy them at the shops.

12. Besides all these before-mentioned, there will be required, as necessary for painting, brass compasses, for setting out and proportioning your work; they also

assist you much in drawing all figures that have a circular form: there is need also of rulers of several lengths; as also squares, crucibles to burn colours, and bladders for oil.

CHAP.

## C H A P. II.

*A Catalogue of the several Colours used in Painting with Oil; their Nature and Way of Making.*

## W H I T E S.

THE principle of all whites is the white-lead; this colour owes its original to the common plumbers lead, of which only it is made. The manner is thus: at Venice, where only the greatest quantities were formerly made, they take sheet-lead, and having cut it into long and narrow slips, they make it up into rolls, yet so as a small distance remains between every spiral revolution; these rolls they put into earthen pots, so ordered, that the lead may not sink down above half way, or better, in them; these pots have each of them very sharp vinegar in the bottom, so full as almost to touch the lead; when the vinegar and lead are both conveyed into the pot, it is covered up close, and so left for a certain time, in

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which

which space the corrosive fumes of the vinegar will reduce the superficies of the lead into a white calx, which they separate by knocking upon it with a hammer. A more particular description of the whole process, you may find communicated to the Royal Society, by Sir Philberto Vernatti, and printed in the Philosophical Transactions.

Of this colour there are two sorts at the colour-shops; the one called ceruss, which is the most pure and clean part; the other is called by the plain name of white-lead: they are colours that work with very much ease, and will be ground as fine even as the oil itself, in comparison, if you will take time enough in the grinding; it lies very smooth, and binds very hard, on what work soever it be laid. If you paint with it any kind of timber-work or stone, that you would preserve from the weather, it is best to work it in linseed-oil, for that will bind it extremely hard, if you lay it upon the work very stiff; but if you use white-lead alone within doors, it is then best to mix it with drying nut oil; for linseed oil within  
doors

doors will turn yellow, and spoil the beauty of it; which inconvenience walnut oil made to dry prevents; for that makes it keep a constant whiteness. -

Besides white-lead and cerufs, there is another sort to be met with sometimes at the colour-shops, which they call flake-white, which is by some accounted the best white of all others, but the reason of that I do not well understand, except it be because it is scarce and dear. This colour is said to be found only under the lead of some very old buildings, where time has, by the assistance of some sharp quality in the air, thus reduced the undermost superficies of the lead in this white calx, which proves a very good white, but, in my opinion, not exceeding the best cerufs, which is as white as the other, and a great deal cheaper. -

### *B L A C K S.*

**LAM-BLACK:** This colour is no other than a soot raised from the rosin and fat parts of fir-trees; it comes mostly from the

northern countries, as Sweden and Norway: it is a black that is more generally used than any other, because of its plenty and cheapness, and proves a very good black for most uses; it is of so fine a body, that if tempered only with linseed oil, it will serve to work with, on most common occasions, without grinding; but thus used, it will require a long time to dry, unless you mix much drying oil with it; or, which is better, some verdigrease finely ground; this and the drying oil together will make it dry in a little time. Some add also oil of turpentine, and without these it will not dry in a long time; for in the substance of the colour is contained a certain greasy fatness, that is an enemy to drying; to remedy which, burning in the fire till it be red-hot, and cease to smoke, will consume that fatness, and then it will dry much sooner; but when it is burned, it must then, of necessity, be ground with the oil, for else it will not work fine; for the fire is of that nature, that it is apt to harden most bodies that pass through it. This colour is usually made up in small  
boxes

boxes and barrels of deal, of several sizes, and so brought over to us.

Besides lam-black, there is another sort of black, called lamp, or candle-black, and this is the foot of a lamp or candle, which I have heard very good artists commend, as a much better black, for any use than the lam-black, it being of a finer body, and brighter colour; but, I think, not to be gotten in very great quantities, and therefore used only in very fine work.

Ivory-black is made of the comb-maker's raspings, and other waste fragments of ivory; these are burned or charred to a black coal in a crucible close stopped up. This proves a very delicate black, when ground very fine: you have it at the shops well prepared, and levigated, or ground very fine with water on a marble-stone, and then dried in small lumps. Being thus prepared, it is the more easily ground in oil, with which it will lie with as good a body as most colours do; but it is something dear, and therefore not used in any common work.

Some use willow-charcoal : this, if ground very fine, does, in oil, make a very good black ; but being not so easy to be gotten as the lam-black, it is seldom used.

### R E D S.

VERMILION is the most delicate of all light reds, being, of itself, a perfect scarlet colour. It is made artificially out of quicksilver and brimstone, in the manner following : Take six ounces of brimstone, and melt it in an iron ladle, then put two pounds of quicksilver into a shammy leather, or double linen cloth ; squeeze it from thence into the melted brimstone, stirring them in the mean time with a wooden spatula till they are well united ; and, when cold, beat the mass into a powder, and sublime it in a glass-vessel, with a strong fire, and it will arise into that red substance, which we call artificial cinaber, or vermilion. The whole process you may see more at large in Lermery's Chymistry. This colour is of a delicate fine body, and, if pains be bestowed  
on

on it, it will grind as fine as the oil itself; and then it makes a most excellent colour: but if it be not ground very fine, the glory of it will not appear, for it will look dull, and work coarse; but if it be ground very fine, no colour in the world looks better, works smoother, bears a better body than vermilion does, nor goes farther.

Lake, especially the richest sorts, is the best of all dark reds, being a very pure crimson. It is a colour that will grind very fine, and lies with a good body; but there must be good store of pains taken with it in the grinding; for if it be not well and thoroughly ground, its colour will want much of its glory; and besides this it will work with some difficulty, being apt to cling together like a jelly; so that it will be apt to cling up together, after it is laid on, just as you see warm water does upon a greasy trencher, when it is washed in it; to prevent which, grind it well, and temper it as stiff as you can well work it. Of this colour there are divers sorts at the colour-shops, very different, some being of a more  
dead.

dead and pale colour. It is made of the tincture of a vegetable, as some say; but what, or how done, I cannot yet learn: only note, that the best sorts come from Venice and Florence.

Red-lead is the lightest of all reds now in use; it is a sandy harsh colour, and not easily ground very fine, although you bestow much labour on it. This colour is made out of common lead, by first reducing it to a litharge; and that litharge being afterward ground to a powder in a mill, is afterward conveyed into a hot furnace, for that purpose, where it is continually kept stirring with an iron rake, till it has attained to the colour of a fine, pale red. The whole process you may see, more at large, in Mr. Ray's Appendix to his Catalogue of hard English Words. — Note. That this, though it be a sandy colour, bears a very good body in oil, and binds very fast and firm, being also a quick drier.

Spanish Brown, is a dark, dull red, of a horse-flesh colour. It is an earth, being dug out of the ground; but there is some  
of

of it of a very good colour, and pleasant enough to the eye, considering the deepness of its colour. It is of great use among painters, being generally used as the first, or priming colour, that they lay on upon any kind of work, being cheap and plentiful, and a colour that works well, if it be ground fine, as you may do, with less labour than some better colours do require. The best sort is the deepest colour, and freest from stones; the other sorts are not so good to give a colour to the eye, but yet they serve as well as any others for a priming colour.

### *Y E L L O W S.*

**YELLOW-OAKER** is of two sorts, one called Plain-Oaker, and the other Spruce-Oaker: the one is a much lighter colour than the other. It is a certain concrete, or stony substance, found among stiff clays in divers parts of this kingdom; but those parts that contain most of it are the Shot-over-Hills near Oxford, whence most of the yellow-

yellow-oaker that is sold in England is dug out. It is a colour that with pains will grind very fine. It bears an excellent body, and resists the weather well.

Pink-yellow is the tincture of a vegetable, whose substance, being reduced to a mucilage, and afterward dried, becomes a good light yellow, a little inclining to a green. It is a colour that grinds very easy, and bears a good body.

Orpiment is that colour that some call yellow-arsenick. It is a good colour for some uses, but very troublesome to grind, being a mineral stony substance of a poisonous nature; therefore take care that the fumes of it do not offend the brain in the time of grinding.

Masticote, is a good light yellow for most uses, especially in making greens, of which several sorts may be framed out of this colour, being mixed with blues. It is a colour that grinds fine, and bears a good body.

*GREENS.*

## GREENS.

VERDIGREASE is the best and most useful green of all others. It is a colour made out of copper, being no other than the rust of that metal promoted by the fumes of sour wine, and the rape of grapes; the process of which, as it is performed at Montpellier in France (where the best is said to be made) you may find in Mr. Ray's Travels, p. 454. It is a delicate green inclining to a blueish; but, with a little pink-yellow, it makes the most delicate grass-green in the world. It is a colour that will grind very fine, but not without some pains; and, when ground fine, it lies with a good body, and works well. At the colour-shops there is a sort of it that they call distilled verdigrease, being a sort that is wholly purified from dross and filth, of good use in fine work, but too dear in vulgar painting.

Green-Bice is a colour of a sandy nature, and therefore not much used. Green-verditer is also a sandy colour. Neither of them bear any good body, and are seldom used,

used, except in landskip, where variety is required.

### *B L U E S.*

**BLUE-BICE** bears the best body of all bright blues used in common work, but it is the palest in colour. It works indifferent well, but inclines a little to be sandy; therefore it requires good grinding, and that on a very hard stone. It is a blue that lies best near the eye of any now in use, except ultra marine, a colour produced from the tincture of lapis-lazuli; the process of doing which you may find in a book called *Modern Curiosities*. But this is so vastly dear, that it is not to be used except in pieces of great price.

**Blue-verditer** is a colour of no good body, but something sandy, and of no very good colour of itself, being apt to turn greenish; and, being mixed with yellow, makes a good green.

**Indigo** is a dark blue, if worked by itself; to remedy which whites are usually mixed, and then it makes but a very faint blue.

This colour is the tincture of a vegetable called by that name, much growing in both the Indies; the leaves of which being put into wooden cisterns, filled with water, are often violently stirred about, till the greatest part be reduced to a slime, or mucilage, which being separated from the water, when sunk to the bottom, and dried, produces that substance which we call indigo. It is a colour that grinds very fine, and lies with a good body, and is very much used in vulgar painting.

Note, That the longer this colour is ground, the more beautiful and fair it looks.

Smalt is the most lovely blue of all others, if it lie at a distance; but it must be only strowed upon a ground of white-lead; for it is a colour that carries no body in oil, it is so sandy; besides, oil changes the colour, and makes it look quite black, except whites be mixed; and they spoil the beauty of the colour, and make it faint: therefore the best way to lay it on is by strowing (as I shall show in the following work) and then

D

there

there is not a more glorious colour in the world.

Note, That of this colour there are two sorts, the one much finer than the other, but the coarsest gives the most glorious colour of all, if looked on at a distance, for near the eye the beauty is not so great; the finest is that which is called oil smalt, which, if ground with white-lead, may be laid in oil; but it bears not a good body, and besides works with much difficulty.

Umber is a colour that really has no affinity with the others before-mentioned, being neither a white, black, red, yellow, blue, or green, yet is a colour of as great use as any of the rest in vulgar painting. It is an earth, or mine, dug out of a certain island in the Mediterranean-sea, being of the complexion of that which among us is called a hair-colour. It grinds very fine, and bears the best body of any earthy colour that is now in use, and when burned becomes the most natural shadow for gold of all others; and, with a mixture of white, it resembles the colour of new oaken wainscot the nearest  
of

of any colour in the world. It dries quickly, and with a good gloss.

*A Term explained in the foregoing Notes,  
about bearing a Body.*

Some may say, What is to be understood by a colour's bearing a body? I say, then, to bear a body, is to be of such a nature as is capable of being ground so fine, and mixing with the oil so entirely, as to seem only a very thick oil of the same colour. Of this nature are white-lead and ceruss, lam-black, ivory-black, vermilion, red-lead, lake, pink, yellow-oaker, verdigrease, ultramarine, indigo, blue-bice, umber, and Spanish-brown. Blue-bice and red-lead, indeed, are not so fine as the rest, but yet so fine as they may be said to bear a very good body. All these may be ground so fine as to be like even oil itself, and then they also may be said to work well, spreading so smooth, and covering the body of what you lay it upon so intirely, as that no part will remain visible where the pencil hath gone, if the colour be worked stiff.

Whereas, on the contrary, verditers and smalts, with all the grinding imaginable, will never be well-imbodied with the oil, nor work well; indeed, bice and red-lead will hardly grind to an oily fineness, nor lie intirely smooth in the working, yet may be said to bear an indifferent body, because they will cover such work very well that they are laid upon: but such colours as are said not to bear a body, will readily part with the oil when laid on the work; so that when the colour shall be laid on a piece of work, there will be a separation, the colour in some parts, and the clear oil in others, except they are tempered extremely thick.

## C H A P. III.

*Of the Burning of Colours, or Preparing  
of them that require to be so used.*

OF this nature there be divers sorts; as, first, lam-black, a colour of so greasy a nature, that, except it be burned, it will require a long time to dry.

Secondly, umber, if you intend it for the colour of a horse-hair, or to be a shadow for gold, then burning fits it for that purpose, by making it brighter and darker.

Lam-black must be burned, or rather dried, thus: Put it into an iron ladle, or a crucible, and set it over a clear fire, letting it remain till it be red-hot, or so near it, that there is no manner of smoke arises from it.

Umbre must only be put into the naked fire in large lumps, and not taken out till they be thoroughly red-hot. If you are more curious, you may inclose it in a crucible, and then put it into the fire till it be red-hot; then take it out, and, when cold, put it up for use.

Ivory must be burned thus: Fill two crucibles with ivory shavings, then clap their two mouths together, and bind them fast with an iron wire, and lute the joints close with clay, salt, and horse-dung, well beaten together; then set it in a fire, covering it all over with coals, and let it remain therein, till you are sure the matter inclosed in the crucibles be thoroughly red-hot; then take it from the fire, but open not the crucibles till they are perfectly cold; for if you should open them while hot, the matter would turn to ashes: the same will be done if the joints are not luted close; for it is only the exclusion of all air that prevents any matter whatever that is burned to a coal from turning to a white ash, and preserves the blackness.

## C H A P. IV.

*How to wash such Colours, as for their Grittiness are not otherwise to be made fine enough for certain Uses.*

SOME colours are of such a gritty, sandy nature, that it is impossible to grind them so fine as some curious works require; therefore, to get forth the flower and fineness of the colour, you must do thus: Take what quantity of colour you please to wash, and put it into a vessel of fair water, and stir it about till the water be all coloured therewith; then, if any filth swim on the top of the water, scum it clean off, and, when you think the grossest of the colour is settled to the bottom, then pour off that water into a second earthen vessel that is large enough to contain the first vessel-full of water four or five times; then pour more water into the first vessel, and stir the colour, that remains, till the water be thick; and, after it is a little settled, pour that water also  
into

into the second vessel, and fill the first vessel again with water, stirring it as before : Do thus often till you find all the finest of the colour drawn forth, and that none but coarse, gritty stuff remains in the bottom ; then let this water in the second vessel stand to settle till it be perfectly clear, and all the colour be sunk to the bottom ; which when you perceive, then pour the water clear from it, and reserve the colour in the bottom for use ; which must be perfectly dried, before you mix it with oil to work.

The colours, thus ordered, are red-lead, blue and green bice, verditer blue and green, smalt, and, many times, Spanish-brown, when you would cleanse it well for some fine work ; as also yellow-oaker, when you intend to make gold size of it.

Take notice, also, That unless you intend to bestow some cost, you need not be at the trouble to wash your colours, but use them for coarse, ordinary work, as you buy them at the shops.

## C H A P. V.

*How to grind Colours with Oil.*

WHEN you come to grind colours, let your grinding-stone be placed about the height of your middle; let it stand firm and fast, so that it joggle not up and down; then take a small quantity of the colour you intend to grind (two spoonfuls is enough) for the less you grind at a time the easier and finer will your colour be ground; lay these two spoonfuls of colour on the midst of your stone, and put a little of your linseed oil to it, (but be sure you put not too much at first) then with your muller mix it together a little, and turn your muller three or four times about, and if you find there be not oil enough, put a little more to it, and grind it till it come to the consistence of an ointment, or appears as free from sandiness, or any sort of lumps, as the most curious sort of butter; for then it grinds much better and sooner than when it is so thin as to run about the stone: You must oftentimes,

times, in the grinding, bring your colour together with a piece of lantern-horn, and with the same keep it together in the middle of your stone; when you find you have ground it fine enough by the continual motion of your muller about the stone, holding it down as hard as your strength will permit (which you must also move with such a sleight, as to gather the colour under it) and that no knots, nor grittiness, remain, but it is as fine even as butter, or as the oil itself; then with your horn cleanse it off the stone into a gally-pot, pan, or whatever else you design to put it into, and then lay more colour on your stone, and proceed to grinding as before: Do so often till you have ground as much of this colour as shall serve your occasions; and if you grind other colours after it, let the stone be well cleansed from the first colour, with a cloth and fine dry ashes, or sand.

Some grind, at one time, so much of every colour, as may be sufficient to serve a long time together, which they keep tied up close in ox or sheep's bladders; and, by this method,

method, a man prevents the daubing of himself too often, by grinding of colours.

Those that like not to be at the trouble of grinding colours themselves, may have of any sort, ready ground, at the colour-shops, at reasonable rates, either in smaller or larger quantities, as they have occasion, from an ounce to an hundred weight, or more.

CHAP.

## C H A P. VI.

*How to order Colours for Working after  
they are ground.*

**W**HEN you have ground your colours (if you observe my directions in grinding) they will be too thick for use, without the addition of more oil; therefore, when you have ground those colours you desire, and intend to use them, either simply by themselves, or compounded with others, according as your fancy or occasions require, you must then add more oil unto them, till they be so thick as not to let the ground, on which they are laid, be seen through them; for if it be so thin as to let the ground be seen through them, or to run about when it be laid on, it is not good, and will require to be coloured the oftener before your work be perfect and substantial; whereas, if your colour be as stiff as it can well be wrought, your work will be done with more speed; once doing being then more than three times doing with thin colour.

Here, by the way, take notice of the fraud and deceit of common painters, who commonly agree to do work by the yard at a certain price, and the work to be coloured three times over, which they commonly paint with such thin colour (to avoid the labour of grinding, a little colour serving a great deal of oil; and, besides, it works with less pains, and takes up less stuff) that all three times doing over is not so substantial as one time would be, if the colour had a thick and substantial body: And I will maintain, that three times colouring with substantial and well-bodied colour, shall last ten times as long as that which is wrought thus slightly by common painters.

In mixing oil with your colours, take this further note, That if the colour to be mixed be your priming colour, (that is, the first colour you lay on) it ought to be made very thin, that it may have oil enough to pierce into the wood, which is much for its preservation; but after your first colour is laid, let your next be thicker, as before is taught.

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Some colours will be a long time before they are dry, if mixed only with plain linseed-oil; to remedy which, there is a way to prepare linseed oil by art, to make any colour dry that is mixed with it. As for example: To a quart of linseed-oil, add two ounces of the litharge of lead (which may be had at every druggist's shop); powder it finely before you put it to the oil; when you have mixed it, set it on the fire in an earthen pan, and let it boil for near an hour, more or less, till the oil be grown thick and fat, and almost of the thickness of treacle that comes from sugar; then set it a little on fire, and stir it well, then put out the flame, and let the matter stand till it be thoroughly cold, and the litharge well settled to the bottom; then pour off the clear oil, and keep it for use in a bladder close tied up; for want of that, in a glass bottle.

When you mix up your colours for working, put three parts of plain linseed-oil, and one part of this drying-oil, together in a pan, and mix them well together, and with this temper up your colours; this fat drying

ing-oil will not only make your colours dry sooner than plain oil, but will also add a beauty and lustre to the colours; so that they will dry with a gloss, as if they had been varnished over.

Some colours, indeed, do not need to have their drying hastened by a fat oil; such are, red-lead, verdigrease, and umber; these are very drying in their own nature, but yet fat oil added to these also, adds a great beauty and lustre to the colour.

Some painters, to make their colours dry, take copperas, and, having beaten it to powder, burn it in a fire-shovel, as people do when they burn allum; that is, they set it on the fire, till, being melted with the heat, it being continued thereon till all the moisture be exhaled, and the matter remain a dry white calx; some of this powder of burned copperas, being added to the colours in grinding, will make the colour dry very well.

The way before recited of making drying oil, has one inconvenience in it, that it makes the oil of a deep reddish colour,

which, in some cases, may alter the native beauty of some colours, as whites, which are apt to become yellow; also blues may, by this means, become greenish.

To prevent this, a drying oil may be prepared, clear and white of colour, in the manner following:

Put the afore-mentioned quantity of linseed oil to the like quantity of litharge; put the mixture into a glass, and set it in the hot sun, for a month, in the summer-time, stirring the litharge and the oil well together, twice a week, during the whole time, and you will not fail in that time to obtain an oil, very white and clear (for the sun takes away all colour, either from linseed, or walnut oil) and also, it will become in that time very fat and thick, and attain to a very drying quality.

By the same methods, may nut-oil be made too dry as well as that of linseed, it being preferred before that of linseed, for all white painting that is not exposed to the open-air; for it is observed, that, in all close places, linseed oil is apt to make white lead turn yellow.

Take

Take notice, That all simple colours used in house-painting, appear much more beautiful and lustrous, when they appear as if glazed over with a varnish, to which both the drying oil before-mentioned contributes very much, and also the oil of turpentine, that the painters use to make their colours dry soon; but experience teaches, that some good clear turpentine, dissolved in the afore-said oil of turpentine, before it be mixed with the oil colours, will make those colours shine, when dry, and preserve their beauty beyond all other things; drying with an extreme glossy surface, and much more smooth than oil alone; and they will also better resist the injuries of air and weather, provided too much be not put in.

## C H A P. VII.

*How to make a Size for the Gilding both  
with Gold and Silver.*

THE operation is thus, for the making of gold size: Take yellow oaker, and grind it on a stone, with water, till it be very fine, and afterwards lay it on a chalk-stone, to dry; this is the common way: Or, you may wash it, as is taught in the Fourth Chapter. For, when it is washed, nothing but the purest of the colour will be used; and, besides, it is done with less daubing.

When your oil and oaker are thus prepared, you must grind them together, as you do other oil colours, only with fat drying oil: but it is more laborious work, and must be ground very fine, even as oil itself: For the finer it is, the greater lustre will your gold carry that is laid on it.

Here note, That you must give it such a quantity of your fat oil, that it may not be so weak as to run when you have laid it on,  
nor

nor so stiff that it may not work well; but of such a competent body, that, after it is laid on, it may settle itself smooth and glossy; which is a chief property of good size.

Silver size is made by grinding white-lead with fat drying oil; some adding a very little verdigrease, to make it bind.

For the practice of gilding with either gold, or silver, I shall refer to Chapter XIV.

## CHAP.

## C H A P. VIII.

*The Practice of Working Oil Colours,  
and Painting of Timber Work, after  
the Manner of Vulgar Painting.*

**V**ULGAR Painting is only the way and manner of colouring all manner of wainscot, doors, windows, posts, rails, pails, gates, border boards for gardens, or any other material that requires either beauty, or preservation from the violence of rain, or injury of weather; the method of doing which, I shall lay down as plain as I can. Suppose, then, that there be a set of palisadoes, or a pair of gates, or some posts and rails to paint, and I would finish them in a stone colour; first look over the work, and take notice whether the joints be open in the gates, or whether there be any large clefts in the posts; for if these are not secured, the wet will insinuate itself into those defects, and make the quicker dispatch in ruining the whole work; let the first business

ness therefore be, to stop up these places smooth and even, with a putty made of whitening and linseed-oil, well beaten together on the grinding-stone with a wooden mallet, to the consistence of a very stiff dough, and with this let all the crannies, clefts, and other defects be perfectly filled up, that it may be equal to the surface of the stuff; then proceed to the priming of the work, with some Spanish-brown well ground, and mixed very thin with linseed oil; with this do over the work, giving it as much oil as it will drink up; this in about two days will be indifferently dry; then if you would do the work substantially, do it over again with the same priming colour; when this is thoroughly dry, then take white-lead well ground and tempered up, not too thin, for the stiffer you work it the better body will be laid on, and the thicker coat of colour that your timber is covered with, the longer it will last; let this colour be well rubbed on, and the whole surface of the work be so intirely covered, that there remain no crick nor corner bare,  
which

which you may easily do by jobbing in the point of a bristle-brush: Let this first colouring dry, and then go over it a second time, and, if you please, a third also; the charge will be a little more, but the advantage will be much greater.

This course is sufficient for any kind of timber work, that requires only a plain colour; whether you thus cover the work with a stone colour, or else with a timber colour in umber and white, or a lead colour with indigo and white; that with white being the cheapest of the three by much: Nay, I have known some lay over their work only with a coat of Spanish brown, by tempering it up more stiff than was done for the two first primings; which in some respects is cheapest of all, and preserves the timber, perhaps, as well as any. Now he that is able to bring the work thus far on has proceeded to the highest pitch of that vulgar painting, that aims at preservation beyond beauty, though something of beauty is necessarily included in this also; but this is not all, for he that is arrived thus far, is in  
a fair

fair way to other perfections in the art of painting. But, for the pannelling of wainscot with its proper shadows, and for imitating olive and walnut-wood, marbles, and such like; these must be attained by ocular inspection, it being impossible to deliver the manner of the operation by precept, without example; and I am bold to affirm, that a man will gain more knowledge by one day's experience, than by a hundred spent to acquire it some other way.

I advise, therefore, all those that desire an insight into this business to be a little curious, if opportunity offers, in observing the manner of a painter's working, not only in grinding his colours, but also in laying them on, and working in them; in all these, observing the motion of his hand in the management of any kind of tool; and by these means, with a little imitation, joined to the directions here given, I doubt not, but, in a short time, you may arrive to great proficiency in the business of vulgar painting.

Note, That if, when you have made use of your colours, there be occasion for a  
small

small cecation till the work be finished; in this case, it is best to cover the colour in your pots with water, for that will prevent their drying, even in the hottest time.

And for your pencils, they ought, as soon as you have done working, to be well washed out in clean linseed oil, and then in warm soap-suds; for if either oil or colours be once dried in the brush or pencil, it is spoiled for ever.

It has been observed, that timber laid over with white, when it has stood some time in the weather, the colour will crack and shrink up together, just as pitch does, if laid on any thing that stands in the sun. The cause of this is, that the colour was not laid on with a stiff body, able to bind itself on firm and fast.

For the close of this chapter, take notice, That if you shall, at any time, have occasion to use either brushes that are very small, or pencils, as in many cases there will be occasion, you ought then to dispose the colours you use upon a pallet (which is a wooden instrument, easy to be had at any

colour-shop) and there work and temper them about with your pencil, that the pencil may carry away the more colour: for you are to note, That if a pencil be only dipped into a pot of colour, it brings out no more with it than what hangs on the outside, and that will work but a little way; whereas, if you rub the pencil about in the colour on the pallet, a good quantity of colour will be taken up in the body of the pencil; and besides all this, you may work your pencils better to a point on a pallet than you can do in a pot; the point of a pencil being of greatest use in divers cases, especially in drawing of lines, and all kinds of flourishing.

## C H A P. IX.

*What Colours are most suitable, and set off best one with another.*

**B**Y setting off best, I mean their making each other look most pleasant; for two of some particular colours put together, or one next the other, will add much to the beauty of each other; as blue and gold, red and white, and such like: but green and black put together look not so pleasant; neither do black and umber, or haw-colour, and such like.

All yellows, then, set off best with blacks, with blues, and with reds.

All blues set off best with whites and yellows.

Greens set off well with blacks and whites.

Whites set off well enough with any colour.

Reds set off best with yellows, and whites, and blacks.

Gold looks well upon a white ground, especially if the matter to be gilt be carved.

Gold and black also shew very well.

Gold on timber colour shews also very well.

So does gold and a horse-flesh colour, made with the brightest Spanish-brown.

But the most glorious ground of all others for gold, are the vermilion-red, the smalt-blue, and the lake, laid on a light ground.

*Of some Colours that arise from Mixture.*

Ash-colour is made of white-lead and lam-black; if a deep ash-colour, then take the more black; but if a light one, then take but little black, and most white.

A lead colour is made of indigo and white.

A colour resembling new oaken timber, is made of umber and white-lead.

A flesh-colour is compounded of lake, white-lead, and a little vermilion.

For a buff colour, take yellow-oaker and white-lead.

For a willow-green, take verdigrease alone.

For a light willow-green, take verdigrease and white.

For a grafs-green, take verdigrease and pink.

A carnation is made of lake and white.

Orange colour, of yellow-oaker and red-lead.

For a light timber colour, mix spruce-oaker and white, and a little umber.

For a brick colour, red-lead, and a little white and yellow-oaker.

For a straw colour, take white and a little yellow-oaker.

Olive-wood is imitated with oaker, and a little white veined over with burned umber.

Walnut-tree is imitated with burned umber, and white veined over with the same colour alone; and in the deepest places with black.

Pails and posts are sometimes laid over only with white, which they call a stone-colour.

Sometimes posts and pails are laid over with indigo and white, which is called a lead-colour.

Window.

Window-frames are laid in white, if the building be new; but if not, then they generally are laid in lead-colour, or indigo and white, and the bars with red-lead.

Doors and gates, if painted in pannels, then the shadows of a white-ground are umber and white; but if laid in a lead-colour, then the shadows are lifted with black.

It is not possible to set down all those varieties of colours that may be produced by mixture: They that would see more, may peruse doctor Salmon's Polygraphice, where they shall find great variety; but those which I have here given an account of are sufficient for common painting.

## C H A P. X.

*Of Painting Sun-Dials; and first, of the Planes on which Dials are to be drawn.*

**D**IAL-PLANES are of two sorts: first, such as are made on the wall of a building; or, secondly, such as are drawn on tables.

The first sort, if they are made on brick-work, is done by plaistering on the wall with lime, sand, and hair mixed: this, if well drenched with linseed oil, after it is dry, or as long as it will drink in any, may be durable enough.

But a better way is, to temper the lime, sand, and hair, with linseed oil, which will be no great charge, but of great advantage; for this mixture will equal, in time, the hardness of a free-stone, and keep the surface as free from the injuries of weather.

If you were to work on a stone, the best way is, to drench the stone with linseed oil  
till

till it will drink in no more; then will whatever you paint upon it be the better prepared against the ruins of time.

Now for tables of wood, they being the most common, I shall give such directions for the making of them, as I have always found most profitable, and fit for this purpose.

The woods that I find best for this use are the clearest oak, and the reddest fir, provided it be not turpentine. Between these two woods I find little difference, as to their alteration by the weather, both being subject to split in case they are bound, and have not free liberty to shrink with dry weather, and swell with wet; but as to their lasting, I judge oak to be the better: and how long fir will last, when secured and defended with oil colours, I have not yet experienced; but we may judge that good red fir, that is hard, will last the age of any man whatsoever, if it be secured as things of this nature ought to be.

In working any of these kinds of woods, I advise, that first your boards be cut to  
such

such a length as you intend your dial-board shall be of, and so many of them as may make up the breadth designed; then let them be jointed and planed on both sides, and afterwards set to dry (for it is observed, that though boards have lain in an house ever so long, and are ever so dry, yet, when they are thus shot and planed, they will shrink afterwards beyond belief, if kept dry :) when you think they are dry enough, and will shrink no more, let them be again shot with good joints, and let every joint be secured by two wooden dove-tails, let in cross the joint on the back-side; but let this be done when the boards are glued together, and well dried; and what a dove-tail is every joiner knows. After it is thus glued, and the joints are sufficiently dry, then let the face of the board be very well planed and tried every way, that it may be both smooth and true, and the edges shot true, and all of a thickness, as pannels of wainscot are commonly wrought; the edges must be thus true and even, that it may fit into the rabbet of a moulding put round it, just  
as

as a pannel of wainscot doth in its frame: this will give liberty to the board to shrink and swell without tearing; whereas, mouldings that are nailed round the edge, as the common way is, do so restrain the motion of the wood, that it cannot shrink without tearing: but boards made this way will last a long time, without either parting in the joints, or splitting in the wood.

Dials are sometimes drawn on planes, lined with copper or lead, that they may be free from splitting or tearing; but I prefer a board (if it be made as above directed) before them, in many respects: as, first, it is much cheaper. Secondly, lead (and copper too a little) will swell with the heat of the sun, and grow in time so hollow, and, as it were, swelled outwards, that the truth of its shadow will be much injured. Thirdly, the colours will be apt to peel from the metal, and the dial will, by that means, be in danger to be sooner defaced, than if it were painted on a wooden plane.

## C H A P. XI.

*How to make the best Glue for gluing the Joints of Dial-Boards.*

**T**HIS may by some, perhaps, be counted needless to be inserted, especially in these parts, where few men that work in timber can be ignorant of it: but suppose a gentleman that lives in the country, has a mind to have a dial-board made, and being not willing to send to London, employs his own carpenter; I must tell you, that many country carpenters scarce understand the right way of making or using glue, to whom such a direction as this may prove very welcome.

Take then a quart of water, and set it on the fire, then put in it about half a pound of good glue, and boil them gently together on a soft fire, till the glue be wholly dissolved, and of a due consistence; for if it be too thin, the wood will so drink it up,  
that

that there will not remain a body sufficient to bind the parts together; on the contrary, if it be too thick, it will not give way for the joint to shut close enough to be strongly joined; for though it is glue that makes the joints stick, yet where there is so much of it, that the joint cannot close exactly, it will never hold firmly.

Whenever you come to the glue, take care that it be first thoroughly hot; for glue that is not hot, never takes firm hold of the wood.

Be sure also, that the substance you are to glue has not been touched with oil, nor injured with grease; for where these have before touched, glue will never afterward take fast hold. But note, That after a thing is once glued fast, no grease nor oil can then hurt it.

Your glue being made ready, and the joints of your boards shot true, set both the faces of the joints close together, and both also turned upwards; then dip a brush in the glue, and besmear the faces of both joints, as quick as possible; then clap the

two

two faces of the joint together, and slide them long-ways one upon another, two or three times, to settle them close; and so let them stand till they are firm and dry.

CHAP.

## C H A P. XII.

*What Colours are requisite for the  
Painting of a Sun-Dial.*

**F**OUR colours are sufficient for this work; viz. Spanish-brown, for the priming, or first colour.

White lead, for the second colour and finishing the face of the table.

Vermilion, for the drawing of the hour-lines.

And lam-black, for the figures in the margent, respecting the lines of every hour, if it be a plain dial.

But if you intend to gild the dial, and the figures, then there is required some others; as gold, and the size to lay it on, and smalt for a blue ground, if you intend a rich colour: but some lay the ground, where the figures are gilt, with vermilion; and that shews well, if the figures are listet with black, and a black moulding round the dial.

The next particular should be the practice of painting the dial; but before that

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can be done the draught must be drawn; and therefore I think a word of advice may not be unseasonable, if it direct you to the best authors that have written of that subject.

To which purpose, I place first, Stirrup's Dialling, as being of excellent use, to acquaint a young learner with the knowledge of the sphere.

The next in order shall be Collins's Dialling, a book of great worth throughout.

The third, Leybourn's Dialling, in which you have the best ways for drawing east and west dials, and far decliners: he is excellent also in the instrumental way.

The fourth is Collins's Sector on a Quadrant; in which you have communicated the cut of a scale, that, by knowing the declination, gives all the rest of the requisites of an upright decliner, by inspection only, with as great exactness, as by the nicest calculation: besides, it teaches the way of drawing the hours of a dial by the tangent-line, and also by the scale of hours; two of the best and most expeditious ways that ever were yet found out.

## C H A P. XIII.

*The Practice of Painting Sun-Dials.*

WHEN, according to the rules given in the books aforementioned, you have drawn on paper the draught of your dial, your board is ready, and your colours prepared according to the directions before given, you must, in the painting of your dial, proceed thus: Take Spanish-brown, that is well ground and mixed somewhat thin, and with a large bristle-brush, dipped therein, colour your board or plane all over, both on the back as well as fore-side, so that you leave no part uncoloured; this is called the priming of your dial: when this first colour is dry, do it over again with more of the same colour, tempered somewhat thicker; and when this is also dry, you may, if you please, do it over again with the same colour; your work will be the more substantial, and last longer.

When this last time of colouring with your red lead be dry, then with white lead

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colour

colour the face of your plane over; and, when it is dry, work it over again three or four times more, successively, after each drying; so shall the face of your plane be sufficiently defended against the many years fury and violence of weather.

When the last colouring of your white be dry, you must draw on your plane (with a black-lead pencil) a horizontal line, so far distant from the uppermost edge of your dial as your discretion shall think fit, or your experience finds to be most becoming your plane; then set out the margin of your dial with boundary lines, for the hour, half hour, and quarter divisions of your dial, as in most dials you see is done. When you have thus set out the margin and boundary lines of your dial, then take your paper-draught fairly drawn, and place the horizontal line, which you before drew on your plane; in doing of which, observe to place the center, according as the situation of your plane, for convenience sake, requires. Thus, if your dial be a full south dial, then let the center be exactly in the middle of your plane;  
but

but if your dial decline from the south, either east or west, then place not the center of your draught in the center of your plane, but nearer to one side or other of it, according as it declines, having also respect to the quantity of its declination.

For example : If your dial decline eastward, then let the center of your draught be placed between the center and the eastern side of your plane ; the quantity thereof must be according as your dial declines ; if it decline but a little, then place the center of your draught but a little from the center of your plane ; and if it decline much, place the center of your draught the more out of the center of your plane : The reason of my advising this is, that by so doing you may gain a greater distance for those hour lines, which in declining planes fall nearer together on one side than they are on the other ; for which reason, I always use it in all declining planes, except they decline far, as between eighty and ninety degrees : for then we commonly draw them without

centers, to gain the more distance for the hour lines.

When your paper draught is thus artificially placed on the plane, and fastened with pins or small tacks, then let the draught thereof be transferred to the plane, by laying a ruler over every hour, half hour, and quarter division: and where your ruler shall cut or intersect the boundary lines of your margin, there make marks, by drawing lines with a black-lead pencil, of such a length as each division requires (or is designed by your boundary lines) observing always to draw the hour and half hour lines quite through your margin, that they may be guides for the right placing the figures, and for a small spot that is usually placed in the margin, right against the half hour.

When your dial-draught is thus transferred to the plane itself, you must not forget to draw the substile-line, according as it lieth in your draught, to be your guide for the right placing your stile or cock; for you must in every particular be very exact, or else your dial cannot be good.

When you have taken every thing that is required from your draught, and have transferred it to the plane, then take your draught off, and with vermilion, very well ground and prepared, as before taught, let the boundary lines of your dial, as also the hour, half hour, and quarter divisions be drawn therewith: let your colour be as thick and stiff as you can possibly work it, so as to draw a clear and smooth line.

When your vermilion lines are drawn, then with lam-black let the figures be made, and a spot in the middle of the margin right against the half hour line; and if you please, in the margin, at the top of your plane, you may put the date of the year, your name, or some divine sentence, as is usual in things of this nature: then fit in your cock so as to make right angles with the plane, so shall your dial be drawn and finished, in all respects, as a plain dial ought to be.

CHAP.

## C H A P. XIV.

*How to gild with Gold on an Oily Size,  
either Letters or Figures, &c.*

WHATEVER you would gild must first be drawn with gold size (of the making of which, see Chap. VI.) according to the true proportion of what you would have gilt, whether figure, letter, or whatever else it be. When you have thus drawn the true proportion of what you would have gilt, let it remain till it be sufficiently dry to gild upon, which you will know, by touching it with the end of your finger; for if your finger sticks a little to it, and yet the colour comes not off, then it is dry enough: but, if the colour comes off on your finger, then it is not dry enough, and must be let alone longer; for if you should then lay your gold on, it would so drown it, that it would be worth nothing: but, if your size should be so dry as not to hold your finger, as it were, to it, then it is too dry, and the  
gold

gold will not take; for which there is no remedy, but new sizing: therefore you must watch the true time, that it be not too wet nor too dry; both extremes being not at all convenient.

When your size is ready for gilding, take your book of leaf gold, and, opening a leaf of it, take it out with your cane-plyers, and lay it on your gilding-cushion, and if it lies not smooth, blow on it with your breath, which will lay it flat and plain; then with a knife of cane, or for want of it, an ordinary pocket knife, that hath a smooth and sharp edge; with this (being wiped very dry on your sleeve, that the gold sticks not to it) let your leaf gold be cut into such pieces or forms, as your judgment shall think most suitable to your work.

When you have thus cut your gold into convenient forms, then take your tool, that was before described in Numb. 9. of Chap. I. and breathe upon it, to make it dampish, that the gold may stick to it; with this tool take your gold up (by clapping it down on the several pieces you had before cut into forms)

forms) and transfer it to your size, upon which clap it down according to discretion, and your gold will leave your tool, and cleave to your size; which you must afterwards press down smooth with a bunch of cotton, or a hare's foot: and thus you must do, piece by piece, till you have covered all your size with gold; and after it is fully dried, then, with your hare's foot, brush off all the loose gold, so will your gilding remain fair and beautiful.

If your work to be gilt, be very large, open your book of leaf gold, and lay the leaf down on your work, without cutting it into pieces, and so do, leaf by leaf, till you have covered quite over what you intend to gild; and, if some particular places should miss there, take up with a small bunch of cotton, a piece of leaf gold, cut to a fit size, and clap it on, that the work may be intirely covered; and, if the gold is to be laid in the hollows of carved work, you must take it up on the point of a camel hair pencil, and convey it in, and with the said pencil, dab it down, till it lies close and smooth.

Note,

Note, That after your gilding is thus perfectly laid on, you may, if you please, diaper, or flourish on it, with thin burned umber, whatsoever shall be suitable to your design: let the umber be tempered but thin, so that the gold may appear through it; the form and order of which, take from examples, which are abundant where painting and gilding are found.

Note further, That a book of gold contains 24 leaves, each leaf being three inches square; the price of each book is two shillings at the gold-beater's; one book will cover 216 square inches of work; for so many square inches are contained in 24 leaves, that are three inches square, every leaf containing nine square inches superficial in gold. The right understanding of this will much guide you in judging how many books of gold will serve to gild that work, whose superficial content in square inches may before-hand be known.

*How*

*How to gild with Silver.*

In laying on silver upon an oily size, the same method, in all respects, is required, as for gilding with gold; save only in this, that the size upon which silver is laid, ought to be compounded of a very little yellow-oaker, and much white-lead; for the size being of a light colour, the silver laid on it will look more natural, and retain its own colour better, the whiter the size is.

Note, That the common painters do now generally, in gilding, use more silver than gold, in most works that are not much exposed to the air; to which they afterwards give the colour of gold, by means of the lacker-varnish; whose use is now so common, that if they gild any thing that stands free from the weather, they only gild with silver, and so give it the colour of gold with a lacker-varnish made of gum-lake, dissolved in spirit of wine, and laid over it.

## C H A P. XV.

*The Way of Painting a Blue with Smalt,  
the only Colours that require Strewing.*

**S**MALT being a colour that gives its greatest lustre by the way of strewing only, I shall lay down the true method of performing this work. Temper up white-lead pretty stiff with good clean drying oil; let it be as stiff as it well can be to spend well from the pencil; with this white colour cover over the superficies of the work you intend to strew with smalt, and be very exact in the work, for the smalt takes no where but on this new and moist ground: then take your smalt; if the work to be done over with it lies flat, strew it thick on the thing to be coloured, and with the feather-edge of a goose-quill stroke over it, that it may lie even, and alike thick on all places; and then with a bunch of linen cloth, that is soft and pliable, dab it down close, that it may take well upon the ground laid under it; and when you imagine the ground

H

to

to be thoroughly dry, then wipe off the loose colour with a feather, and blow the remainder of it off with a pair of bellows; so is your work finished. And thus you have a method for colouring any kind of work, by the way of strewing with smalt, provided the work be such as requires only the plain colour.

But in case you design to paint any kind of body in smalt, that requires shadow for the more perfect resembling the thing you intend: as, suppose it were a blue bell, or a blue boar, or the like: In this case, when you have drawn out the perfect symmetry of the shape you intend, and have covered it with a ground of white-lead, well and stiffly tempered with clear and fat linseed oil, then proceed to give it those necessary shadows you intend, with good black, well tempered; and when you have finished these shadows, then strew on your smalt, as before was directed; and when the whole is dry, and the superfluous part be taken away, the work will appear, with all its shadows, as exact as possible.

Note, That the work, upon which you lay on this ground, to be strewed on with smalt, ought first to be sufficiently primed and laid also over once with white before you lay on the ground, that you may be sure the ground be perfectly white; for a white ground is the only thing that gives beauty and glory to the colour of the smalt.

In all other cases where the work to be strewed over with smalt does not lie flat, you must take smalt up upon a flat bunch of linen cloth, and so dab it upon the ground you are to lay it upon.

## C H A P. XVI.

*How to scour, refresh, and preserve all  
Manner of Oil-Paintings.*

THE oil paintings that I here intend, are only such as are kept from the injuries of weather; for such paintings as endure the fury of rain and storms (such as sun dials, posts, pales, &c.) are not any ways to be renewed or refreshed, but by being new coloured with the same colour in which it was at first wrought; because the body and strength of the colour is worn out by the continual assaults of wasting time, and cannot be kept fresh, unless new done over, once in three or four years, according as the weather is found to wear it off, and make it look dull.

But, as for such paintings that are sheltered from weather, as all in-door paintings are, they still keep their body and colour, although their beauty may be much impaired by dust, smoke, flies, moist vapours, and the like; which will, in time, soil and tarnish them: To remedy which take these few rules.

If

If your painting be wainscoting, or any other joinery or carpentry work, that is painted in oil, take wood-ashes well sifted, which mix with water somewhat thickly; then take a strong stubbed bristle-brush, large, and dip it in the moistened ashes, and therewith rub and scour your painting all over very gently, in all places alike; and when you find that all the soil is taken off, then wash it clean with fair water, and let it dry; and you will find your painting to be near as fresh as when first laid on.

But if your painting be more curious, whether figures of men, beasts, landscape, fruitage, storage, or the like, then let your picture be gently scoured, and then cleanly washed off with fair water: After it is well dry, let it be run over with varnish made with white of eggs, and you will find the beauty and lustre of your picture much recovered.

The whites of eggs before mentioned, are only to be beaten to an oil, and then curiously rubbed on, either with a clean linen cloth, or a pencil.

H 3.

But.

But note, That this scouring ought to be practised but very seldom (as, when your picture is very much soiled) because too frequent operations in this kind, must wear off a little of the colours; therefore strive what you can to preserve their first beauty, by keeping them free from smoke, and by often striking off the dust with a fox-tail; likewise preserving them from flies, by dressing up your rooms with green boughs, to which the flies will gather, and so not hurt your pictures. Sir Hugh Platt, in the first part of his Garden of Eden, and 17th page, tells us of an Italian fancy for this purpose, by hanging in the roof and sides of the room, small pompions or cucumbers stuck full of barley, which will sprout into green spires, on which the flies will lodge. Query, Whether vessels of tin, made round about full of holes, filled with earth, and every hole planted with a sprig of orpen, pennyroyal, mint, &c. and watered as need requires, would not be more beautiful and useful for this purpose?

Another note worth observation is, That all pictures (especially those that are wrought with

with mixtures of white-lead) are apt to tarnish and grow rusty, as is seen in all ancient pieces : To prevent which, in the months of May and June, let your pictures be exposed to the hot sun three or four days ; this will draw off much of the tarnish, and make the colours more fresh and beautiful : And thus doing from year to year, will preserve them wonderfully.

Although, in the beginning of this chapter, I mentioned dials among those things that are not to be refreshed but by new painting ; yet here take notice, That I think it not convenient at all to lay new colouring upon the old ground of a sun-dial (that is, to draw the old lines and figures over again in the same posture wherein they were drawn before) but rather to take the declination anew, and according to that make a new draught of your dial, and proceed in the painting of it, in all respects, as if it were a new dial : for it is observed, That dials which were made many years, as thirty or forty years ago (which we believe went true, when first made) will not give the true hour now, but go very false ; which is caused by  
some

some secret motion of the earth, not hitherto taken notice of, which apparently alters the declination of all planes whatsoever. If any one requires more satisfaction herein, let him repair to some old dial that was made many years ago, and, according to the distance of the subtile from the meridian, let him find out the declination when first made, as any man, that is an artist, can easily do; then let him take the declination of the plane by the sun, and he will find these two declinations to differ considerably, according to the number of years contained between your observation and the time of the dial's first making; so that a plane that stood full south, thirty, forty, or sixty years ago, will now decline some degrees either to the east or west, according to the nature of the earth's motion, which is that which is called the variation of the compass; which is found, by observation, to differ much in the same country, in the space of fifty or sixty years; as all skilled in astronomy know very well.

C H A P.

## C H A P. XVII.

*An Experiment of very near Affinity to Oil-Painting, but of great Use to Travellers of some Kinds, to the chief Officers of Camps and Armies, Seamen, &c.*

THIS experiment is no other than a discovery of the way and mystery of making oil-cloth, now used for hat-cases; and that is this: Take of the drying oil (mentioned in Chap. VI.) set it on the fire, and dissolve it in some good rosin, or (which is better, but dearer) gum-lack; let the quantity be such, as may make the oil as thick as a balsam; for it must not be so thin as to run about, if spread on a cloth: when the rosin or gums are dissolved, you may either work it of itself, or add to it some colour, as verdigrease for a green, or umber for a hair-colour; or white-lead and lam-black for a grey, or indigo and white for a light blue.

This

This varnish, if spread on canvass, or any other linen cloth, so that the cloth be fully drenched and intirely glazed over with it, and suffered to dry thoroughly, is impenetrable for all manner of wet; and if carriers and higlers, and such kind of persons, that are necessitated to travel in all manner of weathers, had but little light canvass cloaks made for them, and these cloaks were afterwards varnished over with the aforesaid varnish, they would secure them from wet, as well as if they remained still in their own houses; for, as I said before, no wet will penetrate through it; four and twenty hours rain would make no more impression upon it, than if it had never rained at all.

The officers tents in a camp, if plastered over with this varnish, will be preserved as securely from all wet, as the best houses, and be as warm and dry; neither will there follow any great inconvenience in decamping; for canvass, so varnished, is almost as pliable as the naked cloth, and not very much more weighty, especially if the varnish  
be

be laid on plain, without any colour mixed with it; for that is both the lighter and more pliable.

The same advantage may seamen reap by it, or any other person that must necessarily attend in storms and rain.

A sheep-skin boot well liquored with this varnish, after the boot is made, and so thoroughly done over as to lie with a gloss on the outside, shall endure more wet than the best neat's-leather boot, being also much more pliable, easy and light: the same may be said of shoes, in great part.

The great reason, why the oil-hat-case has not been more often in use, is on account of the difficulty required to form it into garments, and then the very hat-cases themselves let water in at the seams; but this varnish being laid on after the garments are made, so intirely secures every part, that there is no possibility of the admittance of wet.

The same may be of advantage to abundance of other human necessities too long here to enumerate; and, for securing any  
kind

kind of timber-work, it equals painting with colours in oil, and is much more easy to attain; for linseed oil and rosin are much more easily melted together, by boiling, than colours can any ways be ground; and, being of the consistence of a balsam, works delicately with a brush, and of itself, without the addition of colours, bears a body sufficient to secure all manner of timber-work, equal to most oil colours.

In the working of it there is no great skill required, if you can but use a painter's brush; only let the matter you lay it on be so thoroughly drenched, that the outside may be glazed with it: If you desire a colour on the outside, you need only grind colour with the last varnish you lay on.

## C H A P. XVIII.

*How to preserve all bright Iron-work  
from Rust, and other Injuries of a moist  
and corroding Air, by an Oily Varnish.*

TAKE good Venetian, or, for the want of that, the best and clearest common turpentine; dissolve it in oil of turpentine, and add to it some good drying linseed oil, in which red-lead hath been mixed, made clear by insolation, or long standing in the hot sun (for some uses the common drying linseed oil may serve) mix them well together, and with this mixture varnish over any sort of bright iron work, such as hinges and locks, the iron work of cabinets, or any other kind of iron work whatever, that is used about the houses of the nobility and gentry; as also all kind of bright arms, kept in armories, and other places of publick state: It is a certain preserver of all such iron work from rust, let it be what it will, provided it be such as is not brought into

I                      common

common use; for much handling will wear it off, and heat will again dissolve it; but, for all such bright iron work that is used about either carpenters or joiners work, that require not much handling, as also arms, &c. that stand up for state, rather than present use, it is, as I said before, an infallible preservative.

When you use this oil-varnish, it is best to warm it, and then with a brush lay it on as thin as possible: This is best for arms; but for other iron work it may be laid on cold: in four or five days after it is laid on, it will be thoroughly dry.

Note, That such arms as are done over with it, may, when they come into use, be cleansed from it again, by being warmed hot before a fire; for heat will dissolve it, but water will do it no hurt.

## C H A P. XIX.

*The Art of Back-Painting Metzetinto  
Prints, with Oil Colours.*

**T**HIS mystery consists chiefly in pasting the print upon a piece of glass of such a size as fits the print. Now to do this, take your print and lay it in clean water for two days and two nights, or longer, if your print be on very strong paper; then take it out, and lay it upon two sheets of paper, and cover it with two more, and let it lie there a little to suck out the moisture: In the mean time, take the glass on which your print is to be pasted, and set it near the fire to warm: then take Strasburg turpentine, and put it into a gally-pot, and warm it upon the fire; then take a hog's hair brush, the hairs being well fastened by wedging, as before was shewed, and therewith spread over the turpentine very smoothly on the glass: then take the print from between the paper, and lay it upon the glass, beginning

first at one part, and so rub it down gently, as you go on, till it lies close, and there are no wind-bladders between; then with your fingers roll or rub off the paper from the backside of the print, till you see nothing but the print left upon the glass; and when this is done, set it by to dry; and when it is dry, varnish it over with some white transparent varnish, that the print may be seen through it; and then it is fit for painting.

You may, instead of soaking your prints two days and two nights, roll them up and boil them for about two hours in water, and that will make them as fit for peeling as the other way, when rubbed with your fingers; then having prepared your oil colours, as in the preceding work is directed, grinding them very fine, and tempering them up very stiff, let the backside of the transparent print be coloured over with such colours as each particular part requires, letting the master-lines of the print still guide your pencil; so will each particular colour lie fair to the eye, on the other side, and look almost as well as a painted piece, if it be done neatly.

Note,

Note; That the shadows of the print are generally sufficient for the shadow of every colour; but if you desire to give a shadow from your pencil, then let the shadows be laid on first, and the other colours afterward.

Note also, That, in laying on colours in this kind of backside-painting, you need not be curious in laying them on smooth; it is not at all requisite here, where the chief aim is only to have the colours appear well on the foreside of the print; and therefore the only care to be used in this work is, to lay colour thick enough, that its body may strike the colour of it plainly through the glass.

*Some Directions for mixing of Oil Colours  
for divers Purposes, in this Art of  
Colouring Prints with Oil Colours.*

*Colours for several Faces.*

**F**OR faces that are accounted fair, take white-lead, a little vermilion, and a very small touch of lake.

For the lips, take more of the vermilion and lake than you did for the face.

For a brown face, take burned oaker and white.

For a tawny-moor, take cullens-earth, a little burnt oaker, and a little white.

*Colours for Hair.*

For a brown hair, mix umber and a little black and white.

For a yellow hair, take stone-oaker, white-lead, and a little vermilion.

For a flaxen hair, take white-lead, stone-oaker, and a little cullens-earth.

*Linen,*

*Linen,*

Is done with white-lead or ceruss.

*Silver,*

Is done with white, a little smalt, and some white masticote.

*Gold,*

Is done with red orpiment and white masticote, of each an equal quantity.

*Colours for Garments.*

For blue garments, the best smalt and white-lead.

For a grass-green, mix verdigrease and a little pink-yellow.

For a willow-green, mix verdigrease and a very little white.

A sea green is made by mixing green verditer, pink, and white-lead.

A French green is made by mixing pink and indigo.

A carnation by mixing lake and white-lead.

A crim-

A crimson is made by mixing vermilion, lake, and white.

A scarlet is only vermilion laid on alone.

A cherry colour is made by mixing vermilion and white-lead.

For a yellow, lay on either yellow-orpiment, or yellow-masticote; if your yellows are more pale, then mix white with the former.

For an orange colour, mix red orpiment and a little vermilion.

For a purple, mix smalt, lake, and white.

For a violet, mix bice and lake.

A straw colour is made with white, yellow oaker, and a very little umber.

An ash colour is made by mixing black and white.

A chefnut colour is made by mixing umber, lake, and white.

For a dove colour, or the wings of an angel, take white, a little lake, and a little smalt.

#### *Colours for Trees.*

For the bodies of trees, take pink, yellow, white-lead, and yellow-oaker, and a little black.

For

For the leaves of them that are near the eye, take verdigrease and pink; or if darker-coloured, then take indigo and pink.

For leaves of trees farther off, take green verditer, pink, and white-lead.

For them that are farthest of all, take terrevert and white.

*Colours for Grounds behind the Pictures.*

Note, That a light hair requires a dark ground; and a dark hair, a light ground.

Ground colours for a picture with a light hair, are made with umber, white and black.

A ground colour for a dark hair, is made with umber and white.

*For a Ground in a Landscape.*

Take pink, oaker, and white, with a little green verditer.

For country-houses at a distance, take white-lead, yellow-oaker, and smalt; the same colour serves also for houses of stone.

For brick-houses or walls, take yellow-oaker burned, and white-lead, if the work  
be

be far off; but if near, then India red, and a little white.

For pales of wood or other timber-work, of what kind soever, in country cottages, take umber, white, and a little oaker.

*Sky Colours,*

Are made of smalt and white for the highest skies, more white for the lower, and yellow mixed with a little vermilion for the lowest of all.

## C H A P. XX.

*The Manner of Painting Cloth or Sarfnet  
Sash-Windows.*

**L**ET the cloth or sarfnet be first wet in clean water, and then strained tight to the frames, and there made fast; and when they are thorough dry, varnish them over with the following transparent varnish, thus made:

Take a pound of good clear nut oil, put it into an earthen pipkin, and add to it half a pound of good silver-litharge in fine powder; set it on a small fire, but not to boil, and let it stand hot, at least twelve hours, stirring it often in that time (this adds a drying quality to the oil) when it has stood thus long, pour it off from the litharge by inclination, then take a pound and a half of the clearest white rosin, beat it to powder, and mix it with the oil on a slow fire, always stirring it till the rosin be dissolved; then take it off, and put into it a pound of good clear Venice turpentine, and stir them  
all

all well together; then with a good brush let your fashes be thoroughly varnished over with this mixture, so that they may appear all over clear and transparent.

When this varnish is dry, then you may paint upon them what fancy you please, with oil colours; but landscape is most common and natural, for which purpose, the colours you mix ought to be such as are of a fine body, and apt to become transparent.

For these purposes, lake makes an excellent transparent ruby colour, and distilled verdigrease makes an incomparable transparent green. Orpiment makes an excellent transparent gold colour; umber and yellow-oaker will become indifferently transparent, if thinly mixed; but for the rest, there are none that will lie clear in this work, but only according to the very thinness of their mixture with the oil.

The aforesaid varnish, as it is clear of itself, is an excellent varnish for paper-windows, being much more transparent than any other composition, and more lasting;

for the rosin and turpentine being made tough, when dry, by means of the oil mixed with it, more powerfully resist the injuries of all weather than oil alone.

If any are troubled with weak eyes, and cannot endure a bright light, this varnish, mixed with distilled verdigrease, and paper windows, or sarsnet ones, done over with it, will make an incomparable green light, very comfortable to the sight, and of great benefit to such as love not too much brightness; a note of good use, especially to all great students, whose sight is often much impaired and weakened by poring too much upon their books; the whiteness of the paper being observed to be often a great enemy to the sight of some men, the inconveniencies of which, such a green light as this now mentioned, will infallibly prevent, beyond green reading-glasses, spectacles, or any other contrivance yet found out. The like benefit may some tradesmen also receive from it.

## C H A P. XXI.

*The whole Art and Mystery of Colouring  
Maps, and other Prints, in Water-  
Colours.*

HAVING seen nothing authentic upon this subject, I have thought fit to set forth the way and manner of doing this work, it being an excellent recreation for those who delight in the knowledge of maps; which, by being coloured, and the several divisions distinguished one from the other by colours of different kinds, give a better idea of the countries they describe, than they can possibly do uncoloured.

Now to perform this work after the best manner, there must be provided, in the first place, a lye made with tartar, and a gum-water.

To make the tartar-lye do thus: Take two ounces of the best white tartar, which is a stony substance that sticks to the side of the wine-vessels, and is sold by the drug-  
6 gifts.

gifts. Wrap it up hard and tight in half a sheet of brown cap-paper, wet it thoroughly in water, and put it into a clear fire, either of wood or sea-coal; let it remain therein till it be red-hot quite through, then take it out with a pair of tongs. and put it immediately into a pint of water, and with your fingers rub it well to pieces; put it into a long, narrow glass, and in a day or two the black will all settle, and the lye will become quite clear: pour off the lye into a clean glass, and keep it close stopped for use.

To make gum-water, Take three ounces of the whitest and clearest gum-arabic, which is also sold at the druggists, and beat it as small as you can bruise it; then put it into a pint of fair spring water, and let it dissolve therein, which will be much hastened by shaking the glass three or four times a day very well, that the gum that is dissolved may mix the better with the water that is above it: and when it is all dissolved, if any foulness appear in it, strain it through a rag into a clean earthen dish, and put it

into a glass, and stop it up for use. Note, That too much of this ought not to be made at a time: for if the gum be kept dissolved too long in the water, it will rot, and so be of no use; therefore observe to make it fresh once in two months, or three at the farthest.

In the next place you must prepare or make your colours ready for use; and the best for this work are those that follow: Namely,

Copper-green; and that is made thus: Take a pound of right French verdigrease, made at Montpellier, this being the best; (for the verdigrease made at any other place will fade). To this add three ounces of cream of tartar, beat them both into a fine powder, and take care, while the verdigrease is in the pounding, to stop your nose, and hold a bunch of fine linen in your mouth to breathe through, else the subtil powder of the verdigrease will be apt to offend; and when this is done, mix both the powders in two quarts of water, and boil it in an earthen pipkin till it boil away a quart, then strain

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it out when cold, and put the liquor into a glass, stop it up, and let it stand to settle till the liquor be very clear; so you will have a delicate green. But sometimes, the verdigrease not being always of a goodness, the colour may not be deep enough for some uses: In this case, put some of it into a broad earthen dish, and set it over a chafing-dish of coals, and by a gentle heat diminish so much of the liquor, till, by trying on a paper, and letting it dry, the colour please you. And here you are to note, That if it shine too much when dry, it is not right; for it is not rightly made, except it but just shines: and if you cannot make the colour deep enough by evaporating by heat, the abounding liquid, without making it shine too much, it were better to add some more verdigrease, and boil it up anew, till it become a transparent, deep willow-green. If you would make but a pint of this, you must take but half the quantities of each. And you are also to take notice, that this is a colour that will keep many years with-

out decaying, if the glass that contains it be close stopped up.

The next colour needful to be made, is a stone-colour, or a liquor of myrrh; which is thus done: Take a pint of tartar-lye, and add to it an ounce of the best myrrh in powder, which you can get at the druggists, and boil it till the myrrh is dissolved, which will be done in a small time; let it settle, and pour off the clear for use, which you must keep close stopped up. This is also a tincture which will never decay, and may be made fainter or deeper, by boiling more of the liquor away to make it deeper, or by adding water to it to make it fainter.

And, in the last place, there is required a crimson colour, which is speedily made thus: Buy at the druggists some good cochineal; about half an ounce will go a great way: Take thirty or forty grains, bruise them in a gally-pot to fine powder, then put to them as many drops of the tartar-lye as will just wet it, and make it give forth its colour, and immediately add to it half a spoonful of water, or more, if the colour

colour be yet too deep, and you will have a delicate purple liquor or tincture. Then take a bit of allum, and with a knife scrape very finely a very little of it into the tincture, and this will take away the purple colour, and make it a delicate crimson. Strain this through a fine cloth into a clean gally-pot, and use it as soon as you can; for this is a colour that always looks most noble when soon made use of, for it will decay if it stand long.

Indigo is another colour used in colouring of maps. This is bought at the colour-shops that sell paint, and it must be ground very fine on a stone, as you do oil colours, with a little tartar-lye, to make it give its colour, and look the brighter; when it is ground perfectly fine like a thick syrup, add gum-water to it till it be thin enough for your purpose, and keep it in a glass closely stopped up; but it will settle so, that when you use it, you must stir it up from the bottom.

For a yellow, gumboge is the best: it is sold at the druggists in lumps, and the way to make it fit for use, is to make a little  
hole

hole with a knife in the lump, and put into the hole some water; stir it well with a pencil till the water be either a faint or a deeper yellow, as your occasion requires; then pour it into a gally-pot, and temper up more, till you have enough for your purpose.

Red-lead is also a colour much used in this work, and so is orpiment; both which you may buy at the colour-shops very finely ground, so that they need only to be tempered with gum-water to be fit for use.

Blue-bice is also used often, which needs only to be tempered with gum-water; and when men design to be curious, they may use, instead thereof, ultramarine, which is the best and most glorious of all blues, but vastly dear; yet, small papers of it, of about two shillings price, may be bought at some colour-shops, which, if carefully used, will go a great way: it needs only to be tempered in a very small gally-pot with a little gum-water, till it lie on the paper with a good colour.

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There is also an exceeding glorious red or crimson colour, called carmine, which is also very dear, yet about half a crown's worth will go a great way in the uses to which it is put; it needs only to be tempered with gum-water, and gives several degrees of colour, according as it is thicker or thinner tempered.

Vermilion is also used in some cases. This is a glorious scarlet, and needs only to be tempered with gum-water, for it may be bought, very finely ground to powder, at the colour-shops: only it is to be noted, that this colour shews much brighter when dry, if glazed over with some thick gum-water, made by putting two ounces of gum arabic to half a pint of water, or less.

And for some uses, burned umber, ground very fine with water as thick as possible, and then tempered up with gum-water to a due thickness, makes a good transparent colour.

There is another colour needful in this work, which is a most pleasant grass green; and that is made thus: Take a lump of  
gum-

gumboge, and make a little hole in it; then put therein some copper-green, stir it about with a pencil, and from a willow you will see it turn to a grass green, which you may make deeper or lighter, as you stir it about a longer or a lesser time.

*Of the Practice of Colouring Maps.*

The colours being prepared as before directed, you may proceed to colour a map in this manner; first take notice of the several divisions in a map, which distinguish one kingdom from another, or one county from another, which are known by certain lines, or rows of pricks, or points of several sizes and shapes, agreeable to the divisions they are to denote. As for instance, Portugal is distinguished from Spain by a row of large points, or pricks, and the provinces of that kingdom, or shires, as we call them in England, are distinguished one from another by lines of lesser points or pricks. Now if you were to colour the kingdom of Portugal, do thus; first with a  
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small camel-hair pencil in a duck's-quill, colour over all the hills within the large pricked line that divides it from Spain, with the tincture of myrrh, very thin; then, if there be any woods, dab every tree with the point of a very fine pencil dipped in grass-green, made of copper-green, tempered up with gumboge; but in dipping your pencil into any colour, stroke it against the sides of the pot or glass in which you put it, that the colour may not drop from it and spoil your work; then, with another pencil dipped in red lead, tempered thinly with gum-water, let the principal cities and towns be done over; that the eye may more readily perceive them. Lastly, with a duck's-quill pencil dipped in copper-green, trace out the bounds of one of the provinces, keeping the outmost edge of the pencil close to the pricks; and be careful to lay your colours all alike, and not thick in one place and thin in another, or too deep in some places and too light in others; and when it is almost dry, take another clean pencil of the same size, and dip it in water, stroking the water out

out well, and therewith rub upon the inside of the coloured line, till it take away most of the colour on the edge, and make it grow faint and lose itself by degrees, and continue so to do till you have gone quite round; then take yellow made of gum-boge, and go round the inside of the pricks that divide the next province, sweetening over the innermost side of it, when almost dry, with a pencil dipped in water, as you did before, do over the next to that with the crimson tincture made with cochineal, and the next do round with red-lead, and the next to that with grass green, and the next to that with any of the former colours that will so agree with the work, that two adjoining provinces may not be coloured with the same colour, for then you could not distinguish them.

And in this work of dividing, observe, That when your boundary-lines pass through woods already coloured, or hills; observe then, I say, to miss those woods and hills in your drawing a colour round the province; and be careful also, not to draw any colour

colour over the cities or towns that are painted red, for that spoils the beauty.

And when you have coloured over or divided all the counties, then colour the sea-shore, and all lakes of water, if there be any, with thin indigo, working of that side of the colour, which is from the land, faint, with a wet pencil, as before taught; and, if there be any ships, colour the water shaded at the bottom with the same indigo, painting the hull of the ship with umber, the sails with tincture of myrrh, and the flags with vermilion or blue-bice; and if they are represented as firing their guns, let all the smoke be done with very thin bice; and as for the margent, or square stick of degrees, as the gravers term it, which goes round the map, let that be coloured either with yellow, or red-lead, or crimson; none but those three colours serving well for this purpose.

As for the compartment or title, which consists generally of some neat device to set the map off, and make it appear more beautiful, it may be coloured according to the

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nature

nature of it. As for instance; crowns, or any thing representing gold, with yellow, shadowed in the darkeſt parts of the graving with orpiment; the hair of men or women with tincture of myrrh, or if black, with half water half common ink, or with burned umber; the fleſh of women or boys, with a very little of the tincture of cochineal, in a large quantity of water; and garments either with thin green, ſhadowed with thicker, and with the tincture of cochineal, made thin with water, and ſhaded with the ſame colour thicker, and thin bice, and ſhadowed with a thicker mixture of the ſame, or with vermillion ſhaded with carmine. In general obſerve, That the thinner the colour is laid in the lighteſt part of all garments, and the deeper in the ſhades, the more beautiful it appears; for the thick of the ſame colour is the moſt natural ſhade for moſt colours, except yellow and blue; for blue ſometimes requires to be ſhaded in the darkeſt places with a black, or at leaſt with thick indigo; and yellow requires red lead or crimſon.

If you are to paint clouds, do them sometimes with tincture of myrrh; and in some cases with a very thin crimson; and, for variety, you may do some with thin ivory-black, ground very fine, and tempered up with much gum-water. Smoke is best represented with very thin blue-bice, and if you are to colour any representation of sea-waves, do it with indigo.

If you are to colour any representations of land, do the lightest parts over with very thin yellow, that represents a straw colour, shading it with orpiment; and in other parts, do it with light green, and shade it with a deeper green. Rocks must be done with tincture of myrrh, and the trees, some with copper-green, some with dark grass-green, and some with thin umber. Houses may be done with red-lead, and the tiles with vermilion, or with bice, to represent blue slate; castles may be done with tincture of myrrh in some parts, in others, with thin red-lead; and the spires and pinnacles with blue.

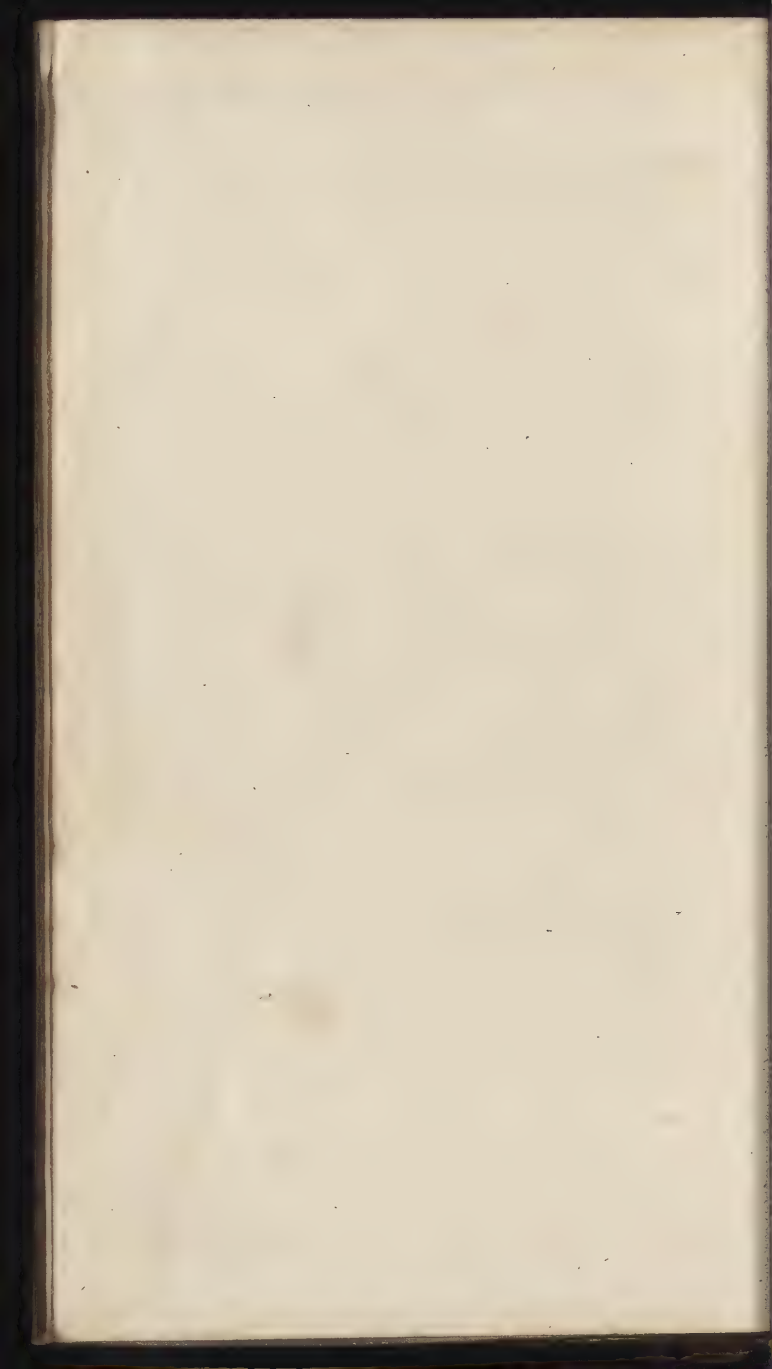
But when all is said that can be said, the only way to colour maps well, is by a pattern

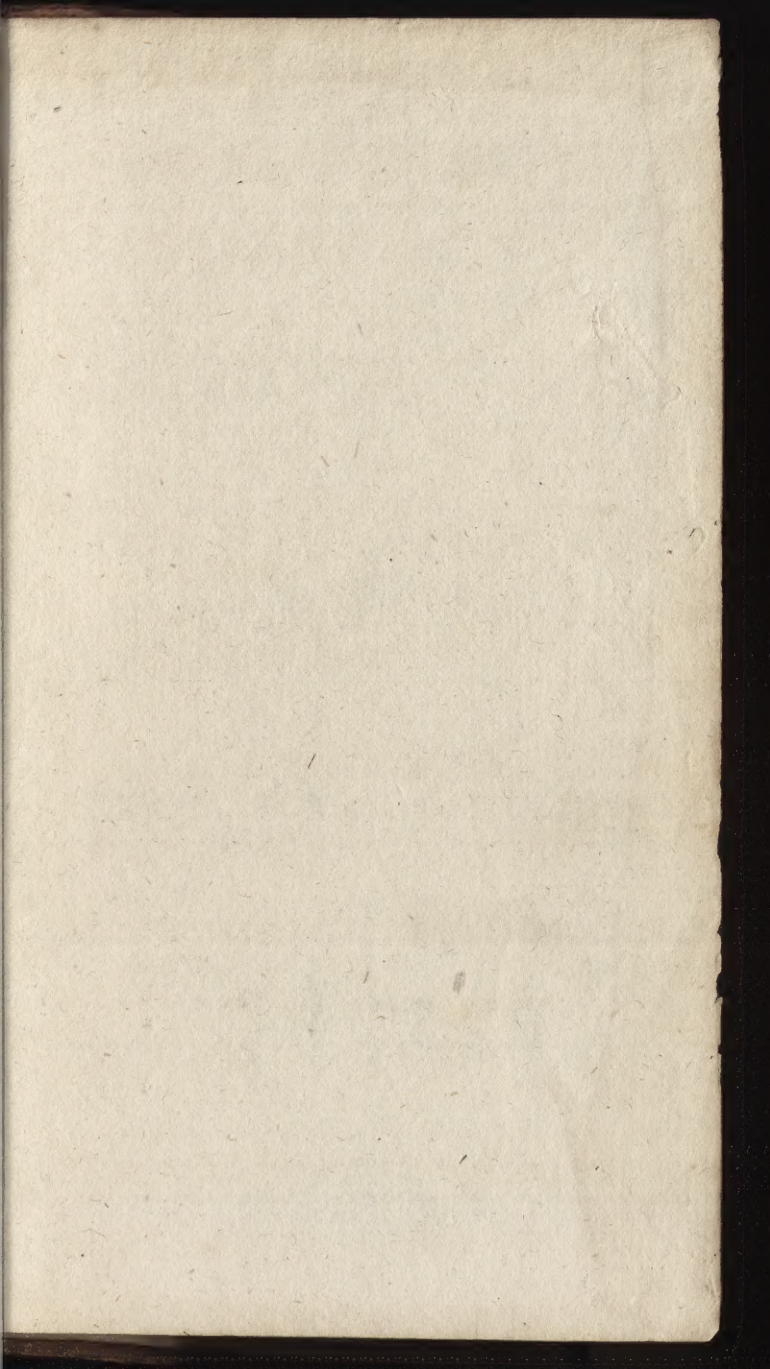
tern done by some good workman, of which the Dutch are esteemed the best. Three or four such maps, coloured by a good artist, are sufficient to guide a man in the right doing of his work : but, if he cannot obtain this, he may, by a few trials, grow a good artist in a short time; and if a man does spoil half a score maps, in order to get the knack of colouring a map well at last, there is no man that is ingenious will grumble at it.

The art of colouring well may be attained to by practice, as was said; but the hardest thing is, to know rightly how to make and prepare the colours, which is here taught faithfully : and if your paper be good, and bear the colours well, without suffering them to sink into it, all that are here mentioned will lie fair and pleasant to the eye; and it is the fairness of the colours that is most esteemed in this art of map-painting : but if the paper be not good and strong, no art can make the colours lie well; therefore in buying maps, chuse those that are printed on the strongest or thickest paper.

*F I N I S.*









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